REMARKS/ARGUMENTS

In response to the above-identified Office Action, claims 1-17 remain pending in the application.

For the reasons set forth more fully below, Applicant respectfully submits that the present claims are allowable. Consequently, reconsideration, allowance and passage to issue of the present application are respectfully requested.

Applicant has amended the specification to correct a minor typographical error and to insert updated information for the incorporated application. Applicant respectfully submits that no new matter has been added by the amendments.

112 Rejection

The Examiner rejected claims 1-17 under 35 U.S.C. 112, second paragraph, as being indefinite. More particularly, the Examiner states that the preamble of independent claims 1, 6, 11, 16 and 17 recite method, system, and computer readable medium containing instructions for optimizing data searches in tree structures but that the body of the claims is silent on the steps and manner to arrive with optimizing data searches in tree structures. Applicant respectfully disagrees.

The claims recite steps and manner that includes external memory organized in multiple search levels of data as sub-trees contained in fixed size blocks. Descent of the search tree based on a search pattern occurs such that each reference to data proceeds from one-half of a sub-tree. Applicant respectfully submits that the recited organization of data in memory and associated manner of proceeding through that data are definite as data searching in tree structures that result

in an optimum solution. Thus, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. 112, second paragraph.

Cited Art Rejections

The Examiner rejected claims 1-17 under 35 U.S.C. 103(a) as being unpatentable over Hyland et al ("Hyland") in view of Loizides et al ("Loizides"). In making the rejection, the Examiner states:

> **As per claims 1, 6, 11, and 16-17, Hyland et al. disclose "organizing multiple search levels of data into sub-trees contained in fixed size blocks of shared external memory of an embedded processing system" by providing a binary search tree that is organized in a multiplicity of level (See Hyland et al. Abstract). Although Hyland et al. make a search for the nodes in a pattern; it is noted, however, Hyland et al. did not specifically disclose the claimed feature of "requiring each reference to the data to proceed from one-half of a sub tree during a descent of the search tree based on a search pattern" as recited in the instant claims 1, 6, 11, and 16-17. On the other hand, Loizides et al. achieved the aforementioned claims feature by providing a multilevel compressed index search method and means which requires a sequential search to begin at a pointer that locates the middle of the index (See Loizides et al. Col. 5, line 67 - Col. 6, line 21; Col. 27, lines 24-50). It would have been obvious ... to modify the search tree method of Hyland et al. wherein the search flow algorithm provided thereof (See Hyland et al. Figure 8) would have incorporated the combined and binary search mechanism of Loizides et al. The motivation being to have greatly increased the search speed of Hyland's seaching method (See Loizides et al. Col. 4, lines 9-12). ...**

Applicant respectfully disagrees with the rejection.

As described in the specification, in accordance with the present invention, the searches performed by a tree search engine are improved with the optimization of a tree structure for data stored in external memory of an embedded processing system. In general, tree searches, retrievals, inserts, and deletes are performed according to a key. Information is stored in the tree in leaves, which contain the keys as a reference pattern. To locate a leaf, a search algorithm processes input parameters that include the key pattern, and then accesses a direct table (DT) to initiate the walking of the tree structure through pattern search control blocks (PSCBs). The

searches occur based on a full match (FM) algorithm, a longest prefix match (LPM) algorithm, or a software management tree (SMT) algorithm. The present invention provides a tree structure of PCSBs optimized for all three types of search algorithms.

An optimization of a tree structure in accordance with the present invention is provided by organizing multiple search levels into sub-trees of PSCBs contained in fixed size blocks of memory and requiring only one-half of each sub-tree during each descent of the search tree with the choice of which half known before the reference of each sub-tree to reduce the size of the required reference. Independent claims 1, 6, 11, and 16-17 recite these aspects of the present invention in varying form. Application respectfully submits that the cited art fails to teach, show, or suggest the recited invention.

The cited art of Hyland is concerned with binary search trees and how they are established and organized. Applicant fails to see any teaching or suggestion that the binary search trees of Hyland are established and organized into sub-trees contained in fixed size blocks of shared external memory, as recited in Applicant's invention. While the Examiner has admitted that Hyland fails to disclose the claimed feature of "requiring each reference to the data to proceed from one-half of a sub tree during a descent of the search tree based on a search pattern," Applicant respectfully submits that even the inclusion of the cited art of Loizides with Hyland does not result in any teaching or suggestion of this claimed feature.

In the cited sections of Loizides, the binary search described is performed on a table of pointers of one level and includes first retrieving the pointer at the middle of the table. Thus, it is a single level of data that is being searched, where a table is being split in half successively to find a pointer in the table. There is nothing from the teaching of finding the middle entry of a single table of data to start a search that teaches or suggests how multiple level of trees should or

would be searched. Thus, Applicant fails to see how locating the middle of a single level teaches or suggests proceeding from one-half of a sub-tree during descent of a search tree based on a search pattern, as recited by the Applicant in independent claims 1, 6, 11, 16 and 17.

Further, the dependent claims recite additional aspects of the independent claims. These additional aspects include choosing the one-half before the descent. Such choosing could not be taught or suggested by Loizides, because the binary search starts from the middle of the table and thus neither half of the table is chosen before the search. Also recited is the choosing of the one-half based on a next bit test value of a bit in the search pattern. Since Loizides fails to teach or suggest the use of choosing, there can be nothing to teach or suggest how such choosing is done.

In view of the foregoing, Applicant respectfully submits that claims 1-17 are not taught, shown, or suggested by the cited art. Accordingly, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. 103(a).

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,

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Date

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